ICAO Global Aviation Partnerships on Emissions Reductions (E-GAP)

Multiplying Environmental Action

NASA’s Environmentally Responsible Aviation Project

Fayette Collier, Ph.D., M.B.A.
Environmentally Responsible Aviation

• Vision
  – expand the viable and well-informed trade space for commercial transport design decisions
  – enable simultaneous realization of national noise, emissions, and performance goals

• Mission
  – Execute integrated technology demonstrations
  – Partner w/Industry and transfer knowledge

• Scope
  – Mature technology for application in the 2020+ time frame
    • Advance the state-of-the-art, reduce risk of application
  – Perform system/subsystem research in relevant environments
Technical input from Fundamental Programs, NRAs, Industry, Academia, Other Gov’t Agencies

ICAO Global Aviation Partnerships on Emissions Reductions (E-GAP) Seminar
ICAO Headquarters, Montréal, 16 to 17 September 2015
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<th>ERA Integrated Technology Demonstrators</th>
<th>Partner</th>
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<td><strong>12A+</strong> AFC Enabled Vertical Tail and Advanced Wing Flight Experiment</td>
<td>Boeing</td>
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<td><strong>21A</strong> Damage Arresting Composites Demonstration</td>
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<td><strong>21C</strong> Adaptive Compliant Trailing Edge Flight Test</td>
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<td><strong>30A</strong> Highly Loaded Front Block Compressor Demonstration</td>
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<td><strong>35A</strong> 2\textsuperscript{nd} Generation UHB Propulsor Integration</td>
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<td><strong>51A</strong> UHB Integration on Hybrid Wing Body Aircraft</td>
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Key Performance Parameter Goal
Demonstrate in flight the viability of an ACTE system, to enable a 5% reduction in wing weight when using a MLC / GLA system on transport aircraft

Technology Insertion Challenges to be Addressed
• Airworthy, non-metallic compliant trailing edge flown at high dynamic pressures
• Flexible transition region flown at transonic high altitude flight conditions
• Analytical and ground test flutter predictions validated through flight

Integrated Technology Demonstrator
NASA/Air Force/FlexSys Gulfstream G3 Testbed Aircraft
Adaptive Compliant Trailing Edge Flight Experiment
March 2015
Projected Impact of ERA on the Fleet

Through 2050 the cumulative delta between RTC to ITD is 88 B gal = 264B dollars

BAU - Business as usual, no technology insertion
RTC - Potential impact of technology available prior to ERA
ITD - Potential impact of ERA Integrated Technology Demo’s
NASA’s ERA Project partners multiplying environmentally sustainable aviation action

Pratt & Whitney
A United Technologies Company

Federal Aviation Administration

GE imagination at work

geneflexsys
engineered to flex

Boeing